Chem2110 Quiz 3
22 December, 2011

TIME: 30 MINUTES

NAME: MODEL ANSWERS **ID NUMBER:** _____

1 H 1.008																	2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La* 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226	89 Ac† (227)															

Maximum Marks	Score

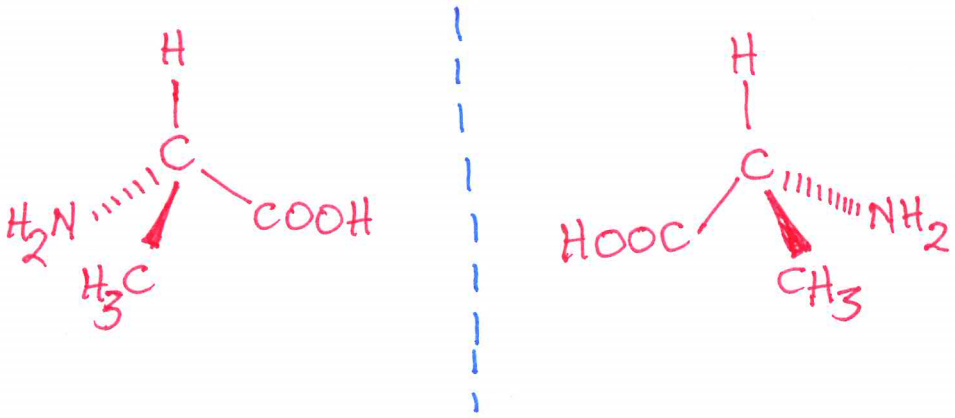
(a) Complete the following paragraph.

A protein is made up of a polypeptide chain of amino acid residues.
Proteins can be classified as globular or fibrous according to their structures.
Two examples of globular proteins are hemoglobin and myoglobin.
Proteins perform various functions. Those that speed up chemical reactions are called enzymes.
Insulin is an example of a protein that is also a hormone. The function of insulin in humans is to regulate the metabolism of glucose in the blood. If insulin does not function normally in the human body, this results in a disease called diabetes mellitus.
The structure of proteins has four levels, namely primary, secondary, tertiary, quaternary.

(b) (i) Glycine is the only achiral amino acid and proline is the only cyclic amino acid.

(ii) Why are enantiomers called optical isomers? Because they are readily distinguishable by plane-polarised light

(iii) Draw the optical isomers of alanine.



(iv) Name the side chains of the following amino acids:

Valine isopropyl

Leucine isobutyl

Isoleucine secondary butyl (sec-butyl, s-butyl)

The side chains of valine, leucine and isoleucine can be described as aliphatic, nonpolar or hydrophobic.

(v) Give another name for each of the following functional groups:

alcohol hydroxyl group

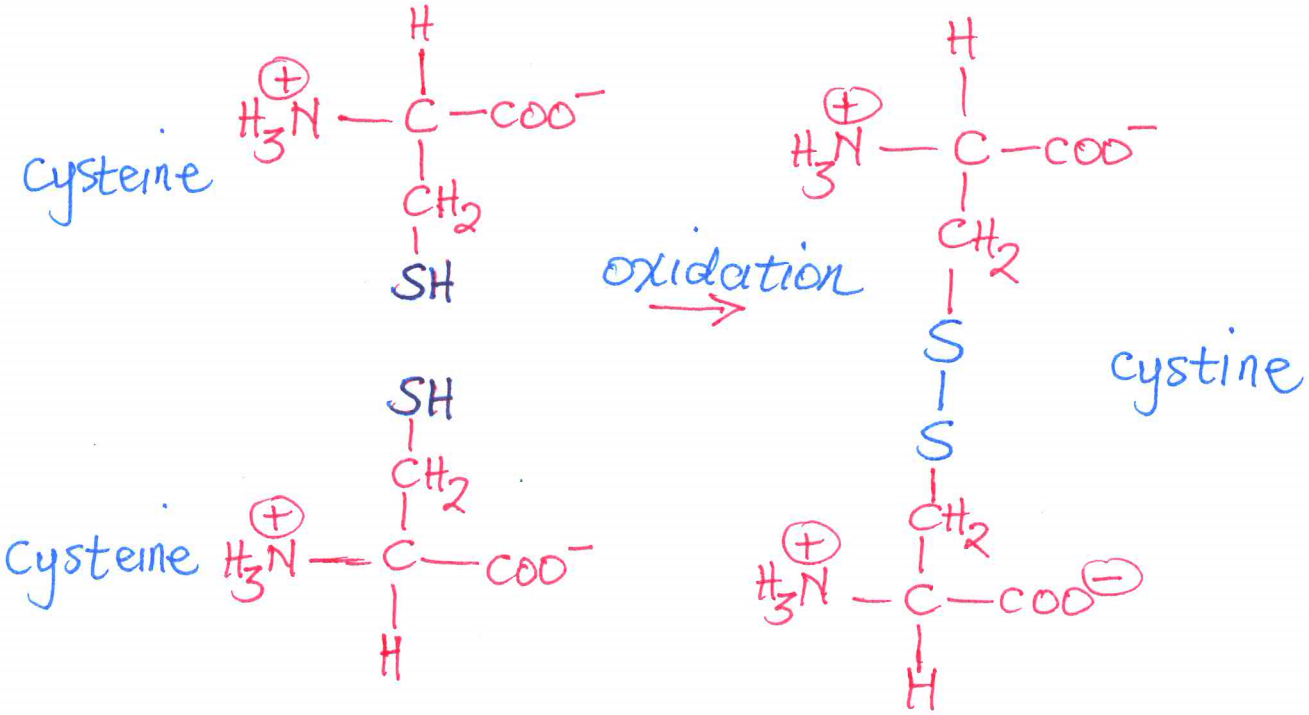
thioether sulfide

thiol sulfhydryl group

(vi) List only **four** main noncovalent intermolecular forces in proteins.

hydrogen bonding
dispersion forces
dipole-dipole forces
salt bridges

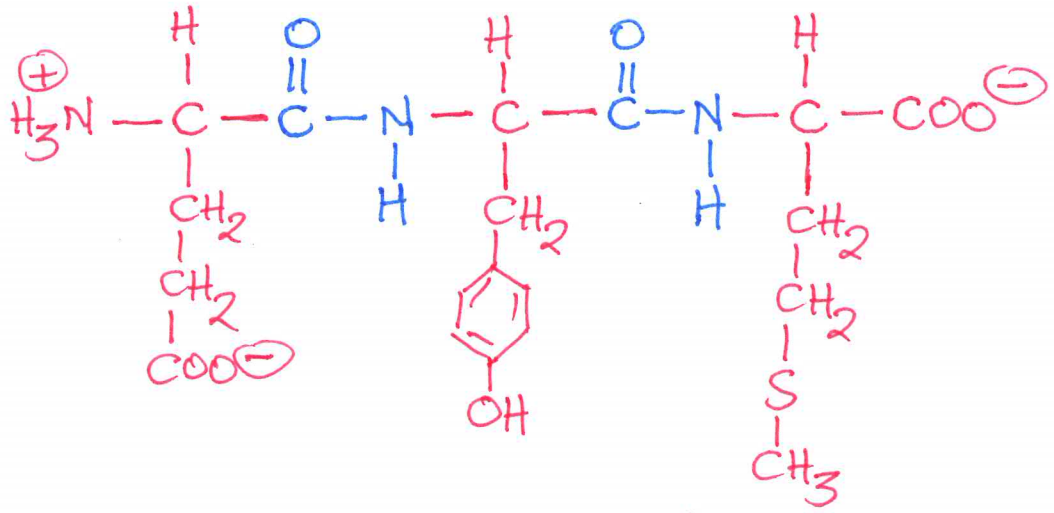
(viii) Draw a simple diagram showing the formation of **cystine**.



(ix) What is denaturation of a protein? List only **three** ways in which a protein may be denatured.

Denaturation is discussed in detail in your textbook on pages 623-625.

(c) **Draw** the structure of the tripeptide **Glu-Tyr-Met** and briefly **describe** it.



The Glu-Tyr-Met tripeptide consists of Glu, Tyr and Met amino acid residues connected by two peptide (amide) bonds that were formed by condensation reaction. The tripeptide starts with an ammonium group ($-\overset{\oplus}{N}H_3$) and ends with a carboxylate group ($-COO^{\ominus}$).